

**REPORT:** FE-22-97

**RAILROAD:** Metro North Commuter Railroad (MNCW)

**LOCATION:** Stamford, Connecticut

**DATE, TIME:** July 18, 1997, 1:29 a.m., EST

**PROBABLE CAUSE:**

Failure of the Conductor/Flagman to remain clear of the main track.

**POSSIBLE CONTRIBUTING FACTOR:**

Failure of the Engineer of the approaching train to sound the horn.

<b>EMPLOYEE:</b>	<b>Craft.....</b>	<b>Transportation</b>
	Activity.....	Installing Catenary Poles
	Occupation.....	Conductor/Flagman
	Age.....	40 years
	Length of Service.....	Seven years, seven months
	Last Rules Training.....	March 11, 1997
	Last Safety Training.....	Aug. 14, 1994
	Last Physical Exam.....	Jan. 24, 1997

**Circumstances Prior to the Accident**

**Conductor/Flagman**

On July 17, 1997, the Conductor/Flagman (Flagman) reported for duty at 8:30 p.m. at Stamford Yard. The Flagman was assigned to work with a 4-person Private Contractor Crew, installing catenary poles for the Center Island Platform Project at Stamford Station. After signing in, the Flagman reviewed the Bulletin Orders, General Notices, and Special Instructions.

The Flagman then proceeded in his private vehicle to Five Pocket. Five Pocket was a location west of Stamford Station and east of the Sheraton Hotel, on the north side of the New Haven Line, milepost 32.7, Catenary Pole No. 360. Five Pocket was the staging area for the Contractor to erect catenary poles. There was a gate in the right-of-way fence that provided access to the

track area.

### Contractor Crew

On July 17, 1997, the Contractor Foreman (Foreman) and his 3-person Crew reported for duty at 9 p.m. at their headquarters in Stamford, CT. The Foreman had his Crew Members load their equipment into a company vehicle and proceed to Five Pocket.

### Lineman/Groundman

On July 17, 1997, the Apprentice Lineman/Groundman (Apprentice Groundman) reported for an overtime assignment at 9 p.m. at MNCW's Bridgeport Maintenance Facility, Bridgeport, CT. The Apprentice Groundman had been assigned to work with another Groundman, and they were to ground the feeder lines for the Contractor. After signing in, the Apprentice Groundman proceeded to Five Pocket at Stamford, CT in his private vehicle.

### The Work Site

At the work site, Track No. 3 had been removed from service between CP-229 (milepost 29.0) and CP-233 (milepost 32.9) by Bulletin Order No. 6-24, dated July 9, 1997 and effective 0030 Hours, Saturday, July 12, 1997. The Contractor had two hi-rail vehicles (a crane and a bucket truck) parked at Five Pocket. The vehicles were being used to erect catenary poles.

On July 17, 1997, the Apprentice Groundman arrived at Five Pocket at about 9:30 p.m., where he met the Flagman. The Contractor Foreman and his 3-person Crew arrived a few minutes later. The Flagman gave the Foreman and his Crew a job briefing. It was at this time that the Apprentice Groundman informed the Foreman that he was not allowed to work alone and that they had to wait for the other Groundman to report to the work site.

MNCW's Construction Inspector arrived at Five Pocket at 10:30 p.m. on July 17, 1997. He was informed of the missing Groundman. The Construction Inspector made several telephone calls and was informed that the Groundman had called in sick at the last minute. The Construction Inspector then arranged for a replacement Groundman from the wire train.

The replacement Groundman arrived at Five Pocket via his private vehicle at about 11 p.m. on July 17, 1997. The Groundman met with the Construction Inspector, Flagman, and Foreman for the Contractor to determine the location where the work was going to be performed. The Groundman requested permission from the Power Department to install grounds on the feeder wires at Catenary Poles Nos. 360 and 349. After receiving permission, the Groundman then instructed the Apprentice Groundman to install the first ground at Catenary Pole No. 360, milepost 32.7. The first ground was installed at 12:45 a.m. on July 18, 1997.

The Foreman requested permission from the Flagman to occupy Track No. 3 with his hi-rail vehicles and move into position at Catenary Pole No. 357 A/B, milepost 32.5, so he could begin

work after the second ground was installed. The Flagman granted the Foreman permission to occupy Track No. 3 and move the vehicles as requested. The Flagman then requested that the Groundman call him via radio after the Groundman installed the second ground, so the Flagman could let the Contractor begin work.

The Apprentice Groundman and the Groundman departed the area of Five Pocket in the Groundman's vehicle and proceeded via local roads to Catenary Pole No. 349 at milepost 32.0. The Apprentice Groundman installed the second ground at Catenary Pole No. 349 at about 1 a.m. on July 18, 1997. The Groundman then informed the Flagman via radio that the ground had been installed. The Groundman walked east along Track No. 3 to the work site at Catenary Pole No. 357 A/B, milepost 32.5. The Groundman had the Foreman sign the Power Department Employee Clearance Form, MP-260.

The Groundman, Foreman, and Flagman were standing in the gage of Track No. 1, when the Flagman informed the Groundman that the work should be completed at about 3 or 4 a.m. The Flagman further informed the Groundman that he or the Foreman would contact the Groundman when the work was finished so the Groundman could remove the grounds. The Flagman then informed the Groundman and Foreman that he would be standing on the outside (south side) of Track No. 4 due to the fact that it provided the Flagman a better view of approaching trains.

The Groundman returned to Catenary Pole No. 349 where the Apprentice Groundman was waiting. The two Groundmen departed the area of Catenary Pole No. 349 in the Groundman's vehicle and returned to the Five Pocket area. The Apprentice Groundman returned to his vehicle while the Groundman remained in his vehicle and reviewed some paperwork.

At approximately 1:20 a.m. on July 18, 1997, the Flagman stopped the work and cautioned the Foreman about the boom of the crane hitting the feeder wires. The Flagman was standing in the gage of Track No. 1 when he cautioned the Foreman.

At about 1:25 a.m., a Consulting Field Engineer/Inspector for the Connecticut Department of Transportation (C-DOT) arrived at the work site to check the installation of the Catenary Pole No. 357 A/B. The Consulting Engineer was not present when the Flagman warned the Foreman about hitting the feeder wires.

#### Train No. 543

On July 17, 1997, the Crew for Train No. 543 reported for duty at 3:45 p.m. at Grand Central Terminal (GCT), New York, New York. The Crew comprised an Engineer, Conductor, and an Assistant Conductor. The Crew was assigned to the PM Protect Locomotive, which was used as a rescue engine in the event a breakdown of equipment occurred during the PM commission hours. The engine was then used as a work extra. The Crew reviewed the bulletin orders and notices, then deadheaded on Train No. 1246 to New Rochelle, NY. Train No. 1246 departed GCT at 4:30 p.m. and arrived at New Rochelle at 5:05 p.m.

The Engineer made a visual check of the locomotive. He then checked the cab signal slip, air brake slip, and headlights. The Engineer took no exceptions. The Crew then conducted a test of the locomotive's air brake system and took no exceptions. The Crew stood by during the PM commission hours. Then at 7:45 p.m., the Crew departed New Rochelle in Engine No. 543 and proceeded eastward to New Haven, CT. The Crew had been instructed to retrieve Flatcar No. MNCW 1033 and transport it to Mt. Vernon Yard in Mt. Vernon, NY. Engine No. 543 arrived in New Haven Terminal, New Haven, CT at about 10 p.m. The accident occurred on MNCW's New Haven Line, at milepost 32.5.

There were four tracks aligned geographically north to south in the accident area designated as Tracks Nos. 3, 1, 2, and 4, from the west to the east. However, railroad timetable direction was east to west, with south (toward New York City), being west. For the remainder of this report, railroad timetable directions will be used. Approaching the accident site from the east, milepost 33.0, located on the west end of Stamford Station, there was tangent track for 660 feet, then a 2-degree, left-hand curve for 1,980 feet to the point of impact. The point of impact was located on the west end of the curve near the spiral to the tangent transition point. There was a 0.58 percent ascending grade from milepost 33.0 to the point of impact.

Trains operated under Traffic Control Systems Rules supplemented by Cab Signal System Rules. Tracks Nos. 3 and 1 were used primarily for westward movements and Tracks Nos. 2 and 4 were used primarily for eastward movements. An overhead catenary system was used for propulsion of trains. Maximum authorized operating speed was 60 mph for passenger trains and 40 mph for freight trains.

The sky was clear, and the temperature was 68° F.

### **The Accident**

The Crew departed New Haven Terminal at about 12:15 a.m. on July 18, 1997, after retrieving Flatcar No. MNCW 1033. The Engineer was seated behind the controls on the right side of the locomotive. The Conductor was seated on the left side of the locomotive, and the Assistant Conductor was seated in the middle of the locomotive facing eastward. Engine No. 543 was being operated with the long hood forward.

The Contractor had finished installing Catenary Pole No. 357A/B. The C-DOT Consulting Engineer checked the level and plumb of the catenary pole. The consulting Engineer also checked the foundation bolts.

The Foreman in his interview stated that he had requested permission from the Flagman to move the vehicles eastward to the next work location at Catenary Pole 358 A/B, milepost 32.6. The Foreman further stated in his interview that the Flagman was sitting on the foundation of the catenary pole opposite Catenary Pole 357 A/B, outside (south) of Track No. 4, and indicated to the Foreman, with a hand gesture, that he had permission to move.

At approximately 1:30 a.m., Engine No. 543 with Flatcar MNCW No. 1033 operated through the work area on Track No. 2. As Engine No. 543 approached the work area, the Engineer noticed the vehicles on Track No. 3. One of the vehicles was facing east and the other vehicle was facing west. The headlights of both vehicles were being used to help illuminate the work site. As Engine No. 543 approached the work area, the Engineer dimmed the headlight. It was shortly after this that the Flagman was struck.

The Engineer in his interview stated that he did not feel or hear anything unusual while traveling through the area. The Engineer further stated that he might have seen something reflective on the Track No. 4 side, possibly a cone. In a hearing held on Oct. 16, 1997, by MNCW, the Engineer stated that he saw the vehicles; however, he did not see anyone in the vicinity of the vehicles, and therefore did not sound the horn or ring the bell.

The Contractor moved to the next work location and started to install Catenary Pole No. 358 A/B. During the installation of the pole, the Crane Operator needed to move from the north side control platform to the south side control platform. The Crane Operator requested that the C-DOT Consulting Engineer watch for trains while the Crane Operator walked along Track No. 1 to get to the south side control platform. The C-DOT Consulting Engineer at first refused, stating that it was the Flagman's responsibility to watch for trains. The Crane Operator then informed the C-DOT Consulting Engineer that he could not find the Flagman. The C-DOT Consulting Engineer watched for approaching trains while the Crane Operator moved to the south side operating platform. This was the first time that anyone noticed that the Flagman was missing. The Contractor finished installing Catenary Pole No. 358 A/B at about 3 a.m. The Contractor Crew Members could not find the Flagman, so they moved their vehicles to the Five Pocket location.

The Crew then removed the vehicles from Track No. 3, while the Foreman informed the Groundman that they were finished and that the Groundman could remove the grounds. The Foreman then inquired whether the Groundman had seen the Flagman. The Groundman stated that he did not know where the Flagman was located. The Groundman and his Apprentice removed the first ground at Catenary Pole No. 360. They then proceeded in the Groundman's vehicle to Catenary Pole No. 349 and removed the second ground. Afterwards, the Groundmen proceeded to the Contractor's headquarters near Catenary Pole No. 349 and had the Foreman sign the Power Department Employee Clearance Form, MP-260. The Groundman and his Apprentice then returned to the Five Pocket area. The Apprentice Groundman departed the Five Pocket area in his private vehicle at about 4 a.m., and the Groundman departed in his private vehicle at about 4:30 a.m.

At 5:57 a.m. on July 18, 1997, the Conductor of Train No. 1507 reported a body in the gage of Track No. 2 at Catenary Pole 357, milepost 32.5 in Stamford, CT. The MNPd responded and found the body of the Flagman. The body was discovered about 132 feet east of Catenary Pole No. 357. The body was on its left side, head facing west and back against the south rail of Track No. 2. Severe head injury was observed, and the victim's right arm was severed at the

shoulder. The victim's left foot had been severed above the ankle, and was found in the victim's boot.

An orange reflective vest was discovered on the body. A (REPCO) 2-way radio was found east of the body. The radio was in the "on" position, and the battery pack had been separated from the radio. A pack of cigarettes and individual cigarettes were found in the gage of Track No. 2.

The victim was pronounced dead by the Medical Examiner at 8:36 a.m. on July 18, 1997. The body was removed about 10 a.m. and transported to Stamford Hospital by Gallagher Funeral Home.

*(Please see the attached three diagrams of Stamford Yard and the surrounding area to better visualize the accident scene and chain of events that led up to the fatality.)*

### **Post-Accident Investigation**

It was determined from the interviews conducted that the Flagman was last observed at about 1:20 a.m. on July 18, 1997.

It was further determined from the evidence at the scene that the Flagman had been standing in the gage of Track No. 2 when he was struck. A review of the train tracking reporting system disclosed that the PMMO with Locomotive No. 543 was the only train to operate on Track No. 2 at the estimated time of the accident.

### **Equipment**

On July 18, 1997, the MNPd conducted an inspection of Locomotive No. 543 on Track No. 14 at Grand Central Terminal (GCT), New York, New York. The inspection disclosed traces of dried blood and hair fibers on the front pilot. Also, there were minute traces of fleshy matter on the wheel frame at the front of the locomotive on the Fireman's side.

A 3-man, post-accident inspection of Locomotive No. 543 was conducted on July 18, 1997. The inspection disclosed that the headlights (low and high beams) and marker lights had operated as intended on both ends of the locomotive. The horn, warning bell, and wipers all worked as intended. No safety appliance defects were noted. The post-accident inspection of the locomotive's air brake system revealed that Locomotive No. 543 was equipped with a 26-6 brake system and iron brake shoes.

The following brake applications and brake cylinder pressures were noted:

#### **Brake Application**

Independent

#### **Brake Cylinder Pressure**

44 PSI

Full Service  
Emergency

65 PSI  
78 PSI

The brake pipe pressure was 90 PSI and brake pipe leakage was measured at 1 PSI per minute. The main reservoir pressure was recorded to be between 138 PSI and 127 PSI. The main reservoir leakage rate was measured to be 0.5 PSI per minute. No exceptions were taken to the locomotive's air brake system. The brake rigging and piston travel were also inspected and no exceptions were taken.

The deadman feature, sanders, fireman's emergency valve, and air compressor were also examined, and no exceptions were taken.

A review of the Locomotive Inspection and Repair Record and Daily Inspection Records disclosed no exceptions.

Event Recorder No. 0089618 from Locomotive No. 543 was downloaded at GCT on July 18, 1997. The data from the event recorder was analyzed at MNCW's North White Plains Mechanical Facility, North White Plains, NY, on July 22, 1997. The analysis of the data disclosed that Locomotive No. 543 was being operated with the front end (long hood) forward. The locomotive was traveling at a speed between 20 and 31 mph. The cab signal was normal, with no change occurring. The brakes were fully charged; the penalty control switch had never been applied. The throttle was being operated consistently with the speed of the train, and the horn had not been sounded.

### Work Procedures

A review of the Catenary Pole Erection Work Procedures revealed that foul time and flagging protection were required for off-track work when fouling an adjacent track or utility overhead lines. The work procedures also required that the outriggers on the crane be set and that the crane level for all hoisting operations be stabilized. From interviews conducted, it was reported that the outriggers of the crane were set only on the north side of Track No. 3.

On July 22, 1997, a review of the train sheets for the New Haven Line was conducted at GCT. The review disclosed that no foul time had been requested between CP 229 (milepost 29.0) and CP 234 (milepost 33.4) from July 13, 1997 to July 18, 1997, from 10 p.m. to 6 a.m.

### Training

A review of the training records of MNCW revealed that only two of the Contractor's personnel had been trained in Roadway Worker Safety.

### Sight Distance

On July 31, 1997, sight distance testing was conducted at the accident site, from midnight to 3 a.m. The weather at the time of the testing was clear and dark. The temperature was about 68° F. Locomotive No. 543 was operated at various speeds to determine the sight distance of the Engineer and Conductor to the point of impact. At 25 mph, with the headlight on dim, the Engineer had a sight distance of 216 feet to the point of impact.

The Conductor had a sight distance of 687 feet to the point of impact at 25 mph. At 25 mph (approximately 37 feet per second), the Engineer had approximately six seconds to view the Flagman and react. The Conductor had approximately 19 seconds to view the Flagman and react.

The Flagman's sight distance from the point of impact to the point where the headlight of the locomotive was first visible was 974 feet. At 25 mph, the Flagman would have had about 26 seconds to view the locomotive and clear the tracks. The illumination of the headlight on high beam would have added eight to 10 seconds to the Flagman's sight distance.

#### Flagging Equipment

A review of the list of items found at the accident site and in the Flagman's vehicle disclosed that the Flagman did not have a flashlight or fuseses as required by Rule No. 35 of the Operating Rules of MNCW.

#### Medical

A review of the Flagman's medical chart by MNCW disclosed that there was no evidence of a safety or medical condition that would have prevented the victim from performing the duties of a Gang Watchman or Flagman. The review also disclosed that the victim's vision was noted to be 20/15 in both eyes, and the victim had excellent binocular vision.

The Medical Examiner stated in a telephone conversation with MNCW's police department that the strike pattern on the victim was consistent with the subject having been struck from behind.

Post-accident toxicology testing revealed that the victim's blood and urine samples tested negative for both drugs and alcohol.

The postmortem conducted on the victim determined that the cause of death was multiple blunt traumatic injuries.

#### Analysis

MNCW policies, practices, and procedures required the Flagman to perform several duties while flagging for the private Contractor. The Flagman was required to provide protection for himself, the private Contractor, and the trains; protect MNCW's property; and secure foul time.



According to post-accident tests conducted, the Flagman had ample time and sight distance to view the approach of Train No. 543 and clear the track area.

### **Corrective Action**

Following the investigation, MNCW took the following actions:

- Halting all work on the Stamford Center Island Platform Project and requiring all personnel to attend safety training classes before returning to work;
- Reviewing the training of personnel at other work sites and arranging safety training as needed; and
- Incorporating a new procedure that required the Groundmen to observe the Contractor while the Contractor was working near overhead lines.

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JOB 65-1

SHEET NO. SK-3

CALCULATED BY: BCO

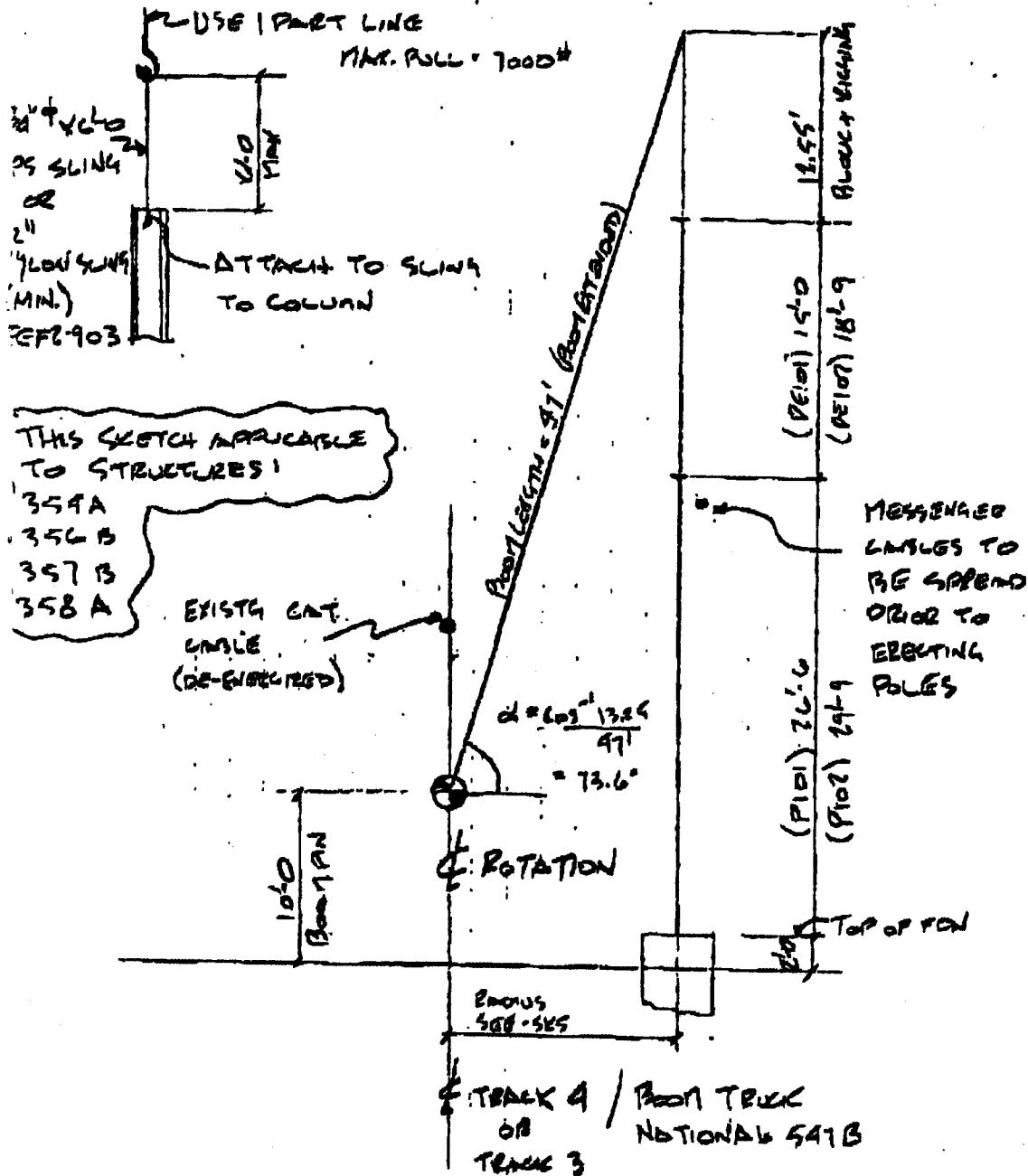
DATE 6-25-97

CHECKED BY: WTB

DATE

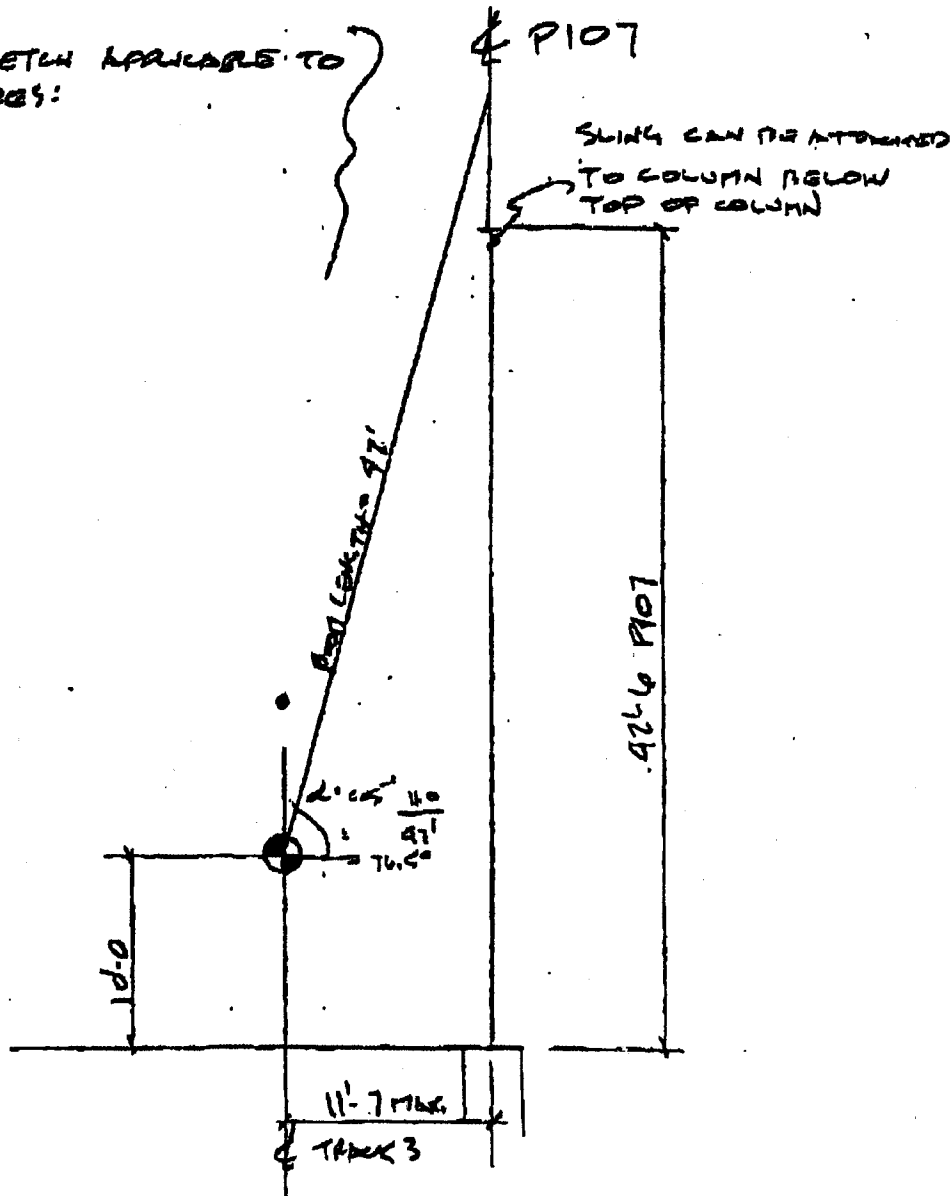
SCALE 1/2" = 1'-0"

# TYPICAL CRANE ELEVATION FOR NEW POLES



08/01/97 FRI 15:53 FAX 203 786 2957  
08/01/97 FRI 14:27W. THOMAS ZIEMAN, P.E.  
500 Summer Street Suite 206  
Stamford, Connecticut 06901  
(203) 356-9200  
FAX (203) 356-9170JOB 65-1  
SHEET NO. SK-4  
CALCULATED BY BCD DATE 6-25-97  
CHECKED BY WTB  
SCALE 1/8" = 1'-0"

## TYPICAL ELEVATION FOR NEW PILES

THIS SKETCH APPLICABLE TO  
STRUCTURES:353 XA  
359 XA  
360 XA

DETAILS:

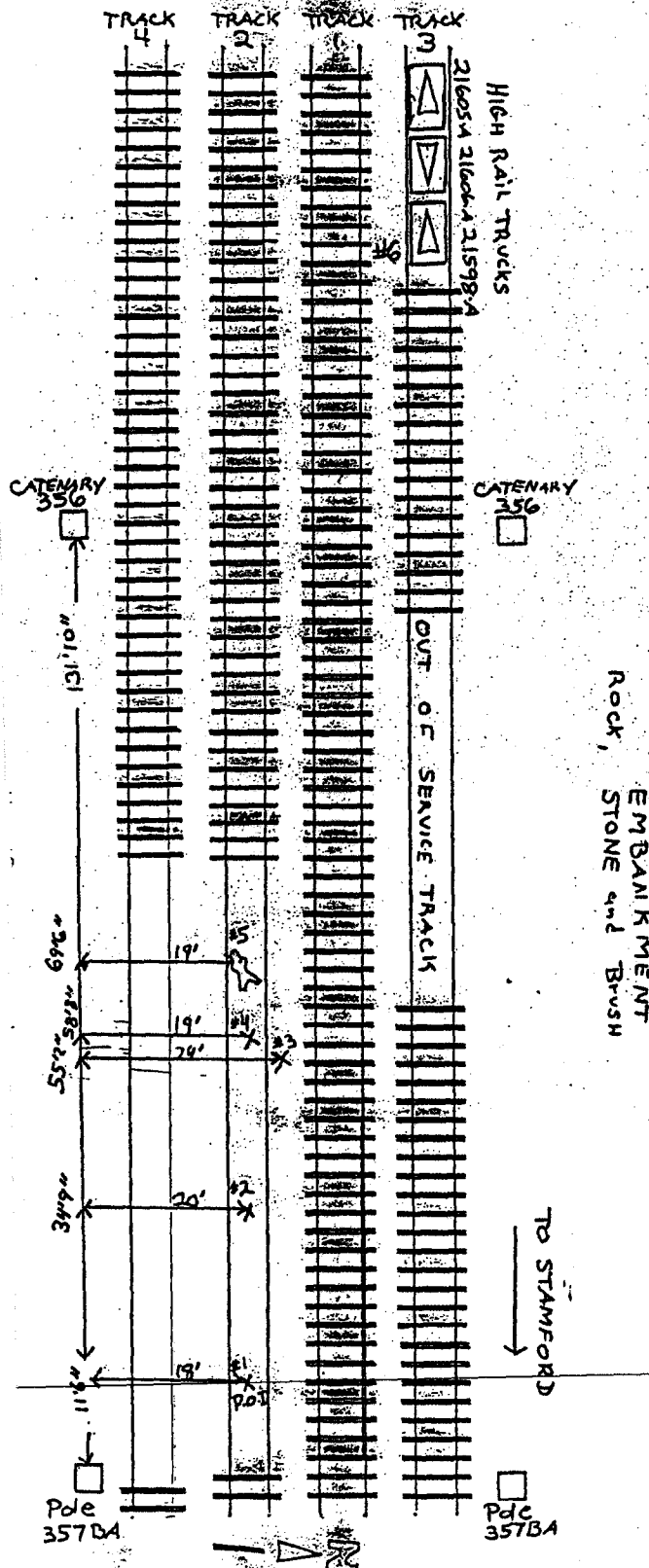
DAIGRAM KEY

- #1- Point of Impact. Approx. 11'6" WEST of Pole 357BA and approx. approx. 18 feet North of the track #4 SOUTH TIE end. Within the gauge of track #2.
- #2- Radio battery pack within the gauge of track #2 and approx. 34'9" WEST of Pole 357BA and approx 20' NORTH of the track #4 SOUTH TIE end.
- #3- Victims RIGHT arm between the track #1 and #2, approx. 55'2" WEST of Pole 357BA, and approx. 24' NORTH of the track #4 SOUTH TIE end.
- #4- Upper portion of a RRPCO radio approx. 58'8" WEST of Pole 357BA and approx 19 feet North of the Track #4 SOUTH TIE end, and within the gauge of track #2
- #5- Body of the victim within the Gauge of track #2, and approx. 69'6" from Pole 357BA and approx. 19' NORTH of the TRACK #4 SOUTH TIE end.
- #6- A RED baseball style cap located between track #1 and 3 approx 200 feet WEST of the point of impact.

A cross-over is present between tracks #2 and #1 in this area and has been deleted from this diagram.

Two additional highrail trucks are parked on track #3 to the EAST of 357BA and are not visable in this diagram.

ALL MEASUREMENTS ARE APPROX. AND THIS DIAGRAM IS NOT DRAWN TO SCALE.



REPORT FOLLOW-UP PREPARED BY:  
t. Thomas W. Bennett

SHIELD NO.  
201

ID NO.  
108296

SIGNATURE

Sgt. J. J. [Signature]

REFERRED TO (UNIT)

ISSUING SUPERVISOR

Capt. S. McCABE

SHIELD NO.

4

ID NO.

010663

SIGNATURE

Capt. S. McCABE

C.O.'s INITIALS

LTSM

ORIGINAL